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(54) MECHANICAL MEMBRANE FOR THE SEPARATION OF A PARAMAGNETIC CONSTITUENT FROM A FLUID

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Field of Classification Search

CPC B01D 53/228; B01D 63/00; B01D 69/02; B01D 2325/46

See application file for complete search history.

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(57) ABSTRACT

The disclosure provides an apparatus and method for the separation of a paramagnetic component from a mixture using a mechanical membrane apparatus. The mechanical membrane comprises a supporting material having a plurality of pores where each pore is surrounded by a plurality of magnetic regions. The magnetic regions augment a magnetic field on one side of the supporting material while mitigating the field to near zero on the opposite side. In operation, a flow of fluid such as air comprising a paramagnetic component such as O₂ is directed toward the mechanical membrane, and the paramagnetic component is typically attracted toward a magnetic field surrounding a pore while dimagnetic components such as N2 are generally repelled. As some portion of the fluid passes through the plurality of magnetic apertures to the opposite side of the mechanical membrane, the mechanical membrane generates a fluid enriched in the paramagnetic component. Alternately, the magnetic field may act to repel the paramagnetic component while diamagnetic components such as N₂ are generally unaffected and pass to the opposite side of the mechanical membrane.

13 Claims, 4 Drawing Sheets

